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JFLAP - Susan H. Rodger 2006 JFLAP: An Interactive Formal Languages and Automata Package is a hands-on supplemental guide through formal languages and automata theory. JFLAP guides students interactively through many of the concepts in an automata theory course or the early topics in a compiler course, including the descriptions of algorithms JFLAP has implemented. Students can experiment with the concepts in the text and receive immediate feedback when applying these concepts with the accompanying software. The text describes each area of JFLAP and reinforces concepts with end-of-chapter exercises. In addition to JFLAP, this guide incorporates two other automata theory tools into JFLAP: JellRap and Pate. *Mathematics and Computation* - Avi Wigderson 2019-10-29 An introduction to computational complexity

theory, its connections and interactions with mathematics, and its central role in the natural and social sciences, technology, and philosophy Mathematics and Computation provides a broad, conceptual overview of computational complexity theory—the mathematical study of efficient computation. With important practical applications to computer science and industry, computational complexity theory has evolved into a highly interdisciplinary field, with strong links to most mathematical areas and to a growing number of scientific endeavors. Avi Wigderson takes a sweeping survey of complexity theory, emphasizing the field's insights and challenges. He explains the ideas and motivations leading to key models, notions, and results. In particular, he looks at algorithms and complexity, computations and proofs, randomness and interaction, quantum and arithmetic computation, and cryptography and learning, all as parts of a cohesive whole with numerous cross-influences. Wigderson illustrates the immense breadth of the field, its beauty and richness, and its diverse and growing interactions with other areas of mathematics. He ends with a comprehensive look at the theory of computation, its methodology and aspirations, and the unique and fundamental ways in which it has shaped and will further shape science, technology, and society. For further reading, an extensive bibliography is provided for all topics covered. Mathematics and Computation is useful for undergraduate and graduate students in mathematics, computer science, and related fields, as well as researchers and teachers in these fields. Many parts require little background, and serve as an invitation to newcomers seeking an introduction to the theory of computation. Comprehensive coverage of computational complexity theory, and beyond High-level, intuitive exposition, which brings conceptual clarity to this central and dynamic scientific discipline Historical

accounts of the evolution and motivations of central concepts and models A broad view of the theory of computation's influence on science, technology, and society Extensive bibliography *Discrete and Computational Geometry* - Satyan L. Devadoss 2011-04-11 Discrete geometry is a relatively new development in pure mathematics, while computational geometry is an emerging area in applications-driven computer science. Their intermingling has yielded exciting advances in recent years, yet what has been lacking until now is an undergraduate textbook that bridges the gap between the two. Discrete and Computational Geometry offers a comprehensive yet accessible introduction to this cutting-edge frontier of mathematics and computer science. This book covers traditional topics such as convex hulls, triangulations, and Voronoi diagrams, as well as more recent subjects like pseudotriangulations, curve reconstruction, and locked chains. It also touches on more advanced material, including Dehn invariants, associahedra, quasigeodesics, Morse theory, and the recent resolution of the Poincaré conjecture. Connections to real-world applications are made throughout, and algorithms are presented independently of any programming language. This richly illustrated textbook also features numerous exercises and unsolved problems. The essential introduction to discrete and computational geometry Covers traditional topics as well as new and advanced material Features numerous full-color illustrations, exercises, and unsolved problems Suitable for sophomores in mathematics, computer science, engineering, or physics Rigorous but accessible An online solutions manual is available (for teachers only). To obtain access, please e-mail: Vickie_Kearn@press.princeton.edu **The Nature of Computation** - Cristopher Moore 2011-08-11

Computational complexity is one of the most beautiful fields of modern mathematics, and it is increasingly relevant to other sciences ranging from physics to biology. But this beauty is often buried underneath layers of unnecessary formalism, and exciting recent results like interactive proofs, phase transitions, and quantum computing are usually considered too advanced for the typical student. This book bridges these gaps by explaining the deep ideas of theoretical computer science in a clear and enjoyable fashion, making them accessible to non-computer scientists and to computer scientists who finally want to appreciate their field from a new point of view. The authors start with a lucid and playful explanation of the P vs. NP problem, explaining why it is so fundamental, and so hard to resolve. They then lead the reader through the complexity of mazes and games; optimization in theory and practice; randomized algorithms, interactive proofs, and pseudorandomness; Markov chains and phase transitions; and the outer reaches of quantum computing. At every turn, they use a minimum of formalism, providing explanations that are both deep and accessible. The book is intended for graduate and undergraduate students, scientists from other areas who have long wanted to understand this subject, and experts who want to fall in love with this field all over again. **Introduction to the Theory of Computation** - Michael Sipser 2012-06-27 Now you can clearly present even the most complex computational theory topics to your students with Sipser's distinct, market-leading INTRODUCTION TO THE THEORY OF COMPUTATION, 3E. The number one choice for today's computational theory course, this highly anticipated revision retains the unmatched clarity and thorough coverage that make it a leading text for upper-level undergraduate and introductory graduate students. This edition

continues author Michael Sipser's well-known, approachable style with timely revisions, additional exercises, and more memorable examples in key areas. A new first-of-its-kind theoretical treatment of deterministic context-free languages is ideal for a better understanding of parsing and LR(k) grammars. This edition's refined presentation ensures a trusted accuracy and clarity that make the challenging study of computational theory accessible and intuitive to students while maintaining the subject's rigor and formalism. Readers gain a solid understanding of the fundamental mathematical properties of computer hardware, software, and applications with a blend of practical and philosophical coverage and mathematical treatments, including advanced theorems and proofs. INTRODUCTION TO THE THEORY OF COMPUTATION, 3E's comprehensive coverage makes this an ideal ongoing reference tool for those studying theoretical computing. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Automata Implementation - Darrell Raymond 1997-06-18 This book constitutes the strictly refereed post-workshop proceedings of the First International Workshop on Implementing Automata, WIA'96, held in London, Ontario, Canada, in August 1996. The volume presents 13 revised full papers together with an introduction and survey. The papers explore the use of software tools in formal language theory; various issues involved in the implementation of automata of all types are discussed. As the first book focusing on implementing automata, this collection of research papers defines the state of the art in the area. Generally speaking, the book advocates the practice of theory in computer science.

An Introduction to Formal Languages and Automata - Peter Linz 2001 Formal languages, automata,

computability, and related matters form the major part of the theory of computation. This textbook is designed for an introductory course for computer science and computer engineering majors who have knowledge of some higher-level programming language, the fundamentals of Modern Applications of Automata Theory - Deepak D'Souza 2012

Introduction To Algorithms Thomas H Cormen 2001 The first edition won the award for Best 1990 Professional and Scholarly Book in Computer Science and Data Processing by the Association of American Publishers. There are books on algorithms that are rigorous but incomplete and others that cover masses of material but lack rigor. Introduction to Algorithms combines rigor and comprehensiveness. The book covers a broad range of algorithms in depth, yet makes their design and analysis accessible to all levels of readers. Each chapter is relatively self-contained and can be used as a unit of study. The algorithms are described in English and in a pseudocode designed to be readable by anyone who has done a little programming. The explanations have been kept elementary without sacrificing depth of coverage or mathematical rigor. The first edition became the standard reference for professionals and a widely used text in universities worldwide. The second edition features new chapters on the role of algorithms, probabilistic analysis and randomized algorithms, and linear programming, as well as extensive revisions to virtually every section of the book. In a subtle but important change, loop invariants are introduced early and used throughout the text to prove algorithm correctness. Without changing the mathematical and analytic focus, the authors have moved much of the mathematical foundations material from Part I to an appendix and have included additional motivational material at the

beginning.

Introduction to Computer Theory - Daniel I. A. Cohen 1991-01-16
Designed for undergraduate courses in computer theory, this textbook covers three areas: formal languages, automata theory and Turing machines. The author substitutes graphic representation for symbolic proofs, making it accessible even to students with little mathematical background.

An Introduction to Formal Languages and Automata - Peter Linz 1997
An Introduction to Formal Languages & Automata provides an excellent presentation of the material that is essential to an introductory theory of computation course. The text was designed to familiarize students with the foundations & principles of computer science & to strengthen the students' ability to carry out formal & rigorous mathematical argument. Employing a problem-solving approach, the text provides students insight into the course material by stressing intuitive motivation & illustration of ideas through straightforward explanations & solid mathematical proofs. By emphasizing learning through problem solving, students learn the material primarily through problem-type illustrative examples that show the motivation behind the concepts, as well as their connection to the theorems & definitions.

A Textbook on Automata Theory - P. K. Srimani 2007-09
A Textbook on Automata Theory has been designed for students of computer science. Adopting a comprehensive approach to the subject, the book presents various concepts with adequate explanations. The logical and structured treatment of the subject promotes better understanding and assimilation. Lucid and well-structured presentation makes the book user-friendly. The book cover the curricula for M.C.A., B.E.(Computer Science) and M.Sc. (Computer Science) at various universities

and gives students a strong foundation for advanced studies in the field. Key features: . A wide array of solved examples and applications . Numerous illustrations supporting theoretical inputs . Exercises at the end of each chapter for practice . Notation for describing machine models . A brief history of mathematicians and computer scientists

Introduction to Languages and the Theory of Computation - John C. Martin 2003 Introduction to Languages and the Theory of Computation is an introduction to the theory of computation that emphasizes formal languages, automata and abstract models of computation, and computability; it also includes an introduction to computational complexity and NP-completeness. Through the study of these topics, students encounter profound computational questions and are introduced to topics that will have an ongoing impact in computer science. Once students have seen some of the many diverse technologies contributing to computer science, they can also begin to appreciate the field as a coherent discipline. A distinctive feature of this text is its gentle and gradual introduction of the necessary mathematical tools in the context in which they are used. Martin takes advantage of the clarity and precision of mathematical language but also provides discussion and examples that make the language intelligible to those just learning to read and speak it. The material is designed to be accessible to students who do not have a strong background in discrete mathematics, but it is also appropriate for students who have had some exposure to discrete math but whose skills in this area need to be consolidated and sharpened.

A Second Course in Formal Languages and Automata Theory - Jeffrey Shallit 2009 A textbook for a graduate course on formal languages and automata theory, building on prior knowledge of

theoretical computer models.
Programming Language Pragmatics - Michael L. Scott 2006 Accompanying CD-ROM contains ... "advanced/optional content, hundreds of working examples, an active search facility, and live links to manuals, tutorials, compilers, and interpreters on the World Wide Web."--Page 4 of cover.
Teaching Formal Methods- Jeremy Gibbons 2009-10-26 This volume contains the proceedings of TFM2009, the Second International FME Conference on Teaching Formal Methods, organized by the Subgroup of Education of the Formal Methods Europe (FME) association. The conference took place as part of the ?rst Formal Methods Week (FMWeek), held in Ei- hoven, The Netherlands, in November 2009. TFM2009 was a one-day forum in which to explore the successes and fa- ures of formal method (FM) education, and to promote cooperative projects to further educationand training in FMs. The organizersgatheredlecturers,tea- ers,andindustrialpartnersto discusstheir experience,presenttheir pedagogical methodologies, and explore best practices. Interest in FM teaching is growing. TFM2009 followed in a series of events on teaching FMs which includes two BCS-FACS TFM workshops (Oxford in 2003, and London in 2006), the TFM2004 conference (Ghent, 2004, with p- ceedings published as Springer LNCS Volume 3294), the FM-Ed 2006 workshop (Hamilton, co-located with FM2006), FORMED (Budapest, at ETAPS2008), and FMET2008 (Kitakyushu, co-located with ICFEM2008). FMs have an important role to play in the development of complex c-puting systems—a role acknowledged in industrial standards such as IEC61508 and ISO/IEC15408, and in the increasing use of precise modelling notations, semantic markup languages, and model-driven techniques. There is a growing need for software engineers who can work

e?ectively with simple, mathematical abstractions, and with practical notions of inference and proof.

Information And Complexity Burgin Mark 2016-11-28 The book is a collection of papers of experts in the fields of information and complexity. Information is a basic structure of the world, while complexity is a fundamental property of systems and processes. There are intrinsic relations between information and complexity. The research in information theory, the theory of complexity and their interrelations is very active. The book will expand knowledge on information, complexity and their relations representing the most recent and advanced studies and achievements in this area. The goal of the book is to present the topic from different perspectives — mathematical, informational, philosophical, methodological, etc.

Introduction to the Theory of Computation - Michael Sipser 2006 "Intended as an upper-level undergraduate or introductory graduate text in computer science theory," this book lucidly covers the key concepts and theorems of the theory of computation. The presentation is remarkably clear; for example, the "proof idea," which offers the reader an intuitive feel for how the proof was constructed, accompanies many of the theorems and a proof. Introduction to the Theory of Computation covers the usual topics for this type of text plus it features a solid section on complexity theory-- including an entire chapter on space complexity. The final chapter introduces more advanced topics, such as the discussion of complexity classes associated with probabilistic algorithms.

Logics for Computer Science Anita Wasilewska 2018-11-03 Providing an in-depth introduction to fundamental classical and non-classical logics, this textbook offers a comprehensive survey of logics for computer scientists. Logics for Computer Science contains intuitive introductory chapters

explaining the need for logical investigations, motivations for different types of logics and some of their history. They are followed by strict formal approach chapters. All chapters contain many detailed examples explaining each of the introduced notions and definitions, well chosen sets of exercises with carefully written solutions, and sets of homework. While many logic books are available, they were written by logicians for logicians, not for computer scientists. They usually choose one particular way of presenting the material and use a specialized language. Logics for Computer Science discusses Gentzen as well as Hilbert formalizations, first order theories, the Hilbert Program, Godel's first and second incompleteness theorems and their proofs. It also introduces and discusses some many valued logics, modal logics and introduces algebraic models for classical, intuitionistic, and modal S4 and S5 logics. The theory of computation is based on concepts defined by logicians and mathematicians. Logic plays a fundamental role in computer science, and this book explains the basic theorems, as well as different techniques of proving them in classical and some non-classical logics. Important applications derived from concepts of logic for computer technology include Artificial Intelligence and Software Engineering. In addition to Computer Science, this book may also find an audience in mathematics and philosophy courses, and some of the chapters are also useful for a course in Artificial Intelligence. **Theory of Computation** - Dexter C. Kozen 2006-05-08 This textbook is uniquely written with dual purpose. It cover cores material in the foundations of computing for graduate students in computer science and also provides an introduction to some more advanced topics for those intending further study in the area. This innovative text focuses primarily on computational complexity

theory: the classification of computational problems in terms of their inherent complexity. The book contains an invaluable collection of lectures for first-year graduates on the theory of computation. Topics and features include more than 40 lectures for first year graduate students, and a dozen homework sets and exercises. What Can Be Computed? - John MacCormick 2018-05-01 An accessible and rigorous textbook for introducing undergraduates to computer science theory What Can Be Computed? is a uniquely accessible yet rigorous introduction to the most profound ideas at the heart of computer science. Crafted specifically for undergraduates who are studying the subject for the first time, and requiring minimal prerequisites, the book focuses on the essential fundamentals of computer science theory and features a practical approach that uses real computer programs (Python and Java) and encourages active experimentation. It is also ideal for self-study and reference. The book covers the standard topics in the theory of computation, including Turing machines and finite automata, universal computation, nondeterminism, Turing and Karp reductions, undecidability, time-complexity classes such as P and NP, and NP-completeness, including the Cook-Levin Theorem. But the book also provides a broader view of computer science and its historical development, with discussions of Turing's original 1936 computing machines, the connections between undecidability and Gödel's incompleteness theorem, and Karp's famous set of twenty-one NP-complete problems. Throughout, the book recasts traditional computer science concepts by considering how computer programs are used to solve real problems. Standard theorems are stated and proven with full mathematical rigor, but motivation and understanding are enhanced by considering concrete implementations. The book's

examples and other content allow readers to view demonstrations of—and to experiment with—a wide selection of the topics it covers. The result is an ideal text for an introduction to the theory of computation. An accessible and rigorous introduction to the essential fundamentals of computer science theory, written specifically for undergraduates taking introduction to the theory of computation Features a practical, interactive approach using real computer programs (Python in the text, with forthcoming Java alternatives online) to enhance motivation and understanding Gives equal emphasis to computability and complexity Includes special topics that demonstrate the profound nature of key ideas in the theory of computation Lecture slides and Python programs are available at whatcanbecomputed.com Computability and Complexity Theory - Steven Homer 2011-12-09 This revised and extensively expanded edition of Computability and Complexity Theory comprises essential materials that are core knowledge in the theory of computation. The book is self-contained, with a preliminary chapter describing key mathematical concepts and notations. Subsequent chapters move from the qualitative aspects of classical computability theory to the quantitative aspects of complexity theory. Dedicated chapters on undecidability, NP-completeness, and relative computability focus on the limitations of computability and the distinctions between feasible and intractable. Substantial new content in this edition includes: a chapter on nonuniformity studying Boolean circuits, advice classes and the important result of Karp–Lipton. a chapter studying properties of the fundamental probabilistic complexity classes a study of the alternating Turing machine and uniform circuit classes. an introduction of counting classes, proving the famous results of Valiant and Vazirani

and of Toda a thorough treatment of the proof that IP is identical to PSPACE With its accessibility and well-devised organization, this text/reference is an excellent resource and guide for those looking to develop a solid grounding in the theory of computing. Beginning graduates, advanced undergraduates, and professionals involved in theoretical computer science, complexity theory, and computability will find the book an essential and practical learning tool. Topics and features: Concise, focused materials cover the most fundamental concepts and results in the field of modern complexity theory, including the theory of NP-completeness, NP-hardness, the polynomial hierarchy, and complete problems for other complexity classes Contains information that otherwise exists only in research literature and presents it in a unified, simplified manner Provides key mathematical background information, including sections on logic and number theory and algebra Supported by numerous exercises and supplementary problems for reinforcement and self-study purposes

Information Theory, Inference and Learning Algorithms David J. C. MacKay 2003-09-25 Table of contents
Foundations of Machine Learning, second edition Mehryar Mohri 2018-12-25 A new edition of a graduate-level machine learning textbook that focuses on the analysis and theory of algorithms. This book is a general introduction to machine learning that can serve as a textbook for graduate students and a reference for researchers. It covers fundamental modern topics in machine learning while providing the theoretical basis and conceptual tools needed for the discussion and justification of algorithms. It also describes several key aspects of the application of

these algorithms. The authors aim to present novel theoretical tools and concepts while giving concise proofs even for relatively advanced topics. Foundations of Machine Learning is unique in its focus on the analysis and theory of algorithms. The first four chapters lay the theoretical foundation for what follows; subsequent chapters are mostly self-contained. Topics covered include the Probably Approximately Correct (PAC) learning framework; generalization bounds based on Rademacher complexity and VC-dimension; Support Vector Machines (SVMs); kernel methods; boosting; on-line learning; multi-class classification; ranking; regression; algorithmic stability; dimensionality reduction; learning automata and languages; and reinforcement learning. Each chapter ends with a set of exercises. Appendixes provide additional material including concise probability review. This second edition offers three new chapters, on model selection, maximum entropy models, and conditional entropy models. New material in the appendixes includes a major section on Fenchel duality, expanded coverage of concentration inequalities, and an entirely new entry on information theory. More than half of the exercises are new to this edition.

Reinforcement Learning, second edition - Richard S. Sutton 2018-11-13
The significantly expanded and updated new edition of a widely used text on reinforcement learning, one of the most active research areas in artificial intelligence. Reinforcement learning, one of the most active research areas in artificial intelligence, is a computational approach to learning whereby an agent tries to maximize the total amount of reward it receives while interacting with a complex, uncertain environment. In Reinforcement Learning, Richard Sutton and Andrew Barto provide a clear and simple account of the field's key ideas and

algorithms. This second edition has been significantly expanded and updated, presenting new topics and updating coverage of other topics. Like the first edition, this second edition focuses on core online learning algorithms, with the more mathematical material set off in shaded boxes. Part I covers as much of reinforcement learning as possible without going beyond the tabular case for which exact solutions can be found. Many algorithms presented in this part are new to the second edition, including UCB, Expected Sarsa, and Double Learning. Part II extends these ideas to function approximation, with new sections on such topics as artificial neural networks and the Fourier basis, and offers expanded treatment of off-policy learning and policy-gradient methods. Part III has new chapters on reinforcement learning's relationships to psychology and neuroscience, as well as an updated case-studies chapter including AlphaGo and AlphaGo Zero,

Atari game playing, and IBM Watson's wagering strategy. The final chapter discusses the future societal impacts of reinforcement learning.
A Book of Abstract Algebra - Charles C Pinter 2010-01-14 Accessible but rigorous, this outstanding text encompasses all of the topics covered by a typical course in elementary abstract algebra. Its easy-to-read treatment offers an intuitive approach, featuring informal discussions followed by thematically arranged exercises. This second edition features additional exercises to improve student familiarity with applications. 1990 edition.
Automata, Computability and Complexity - Elaine Rich 2008
For upper level courses on Automata. Combining classic theory with unique applications, this crisp narrative is supported by abundant examples and clarifies key concepts by introducing important uses of techniques in real systems. Broad-ranging coverage allows instructors to easily customise

course material to fit their unique requirements.

Principles of Cyber-Physical Systems - Rajeev Alur 2015-04-24 A foundational text that offers a rigorous introduction to the principles of design, specification, modeling, and analysis of cyber-physical systems. A cyber-physical system consists of a collection of computing devices communicating with one another and interacting with the physical world via sensors and actuators in a feedback loop. Increasingly, such systems are everywhere, from smart buildings to medical devices to automobiles. This textbook offers a rigorous and comprehensive introduction to the principles of design, specification, modeling, and analysis of cyber-physical systems. The book draws on a diverse set of subdisciplines, including model-based design, concurrency theory, distributed algorithms, formal methods of specification and verification, control theory, real-time systems, and hybrid systems, explaining the core ideas from each that are relevant to system design and analysis. The book explains how formal models provide mathematical abstractions to manage the complexity of a system design. It covers both synchronous and asynchronous models for concurrent computation, continuous-time models for dynamical systems, and hybrid systems for integrating discrete and continuous evolution. The role of correctness requirements in the design of reliable systems is illustrated with a range of specification formalisms and the associated techniques for formal verification. The topics include safety and liveness requirements, temporal logic, model checking, deductive verification, stability analysis of linear systems, and real-time scheduling algorithms. Principles of modeling, specification, and analysis are illustrated by constructing solutions to representative design problems from distributed algorithms, network protocols, control

design, and robotics. This book provides the rapidly expanding field of cyber-physical systems with a long-needed foundational text by an established authority. It is suitable for classroom use or as a reference for professionals.

Formal Methods Teaching - Brijesh Dongol 2019-09-23 This book constitutes the refereed proceedings of the Third International Workshop and Tutorial, FMTea 2019, Held as Part of the Third World Congress on Formal Methods, FM 2019, Porto, Portugal, October 2019. The 14 full papers presented together with 3 abstract papers were carefully reviewed and selected from 22 submissions. The papers are organized in topical sections named: Tutorial lectures; Teaching Program Verification; Teaching Program Development; and Effective Teaching Techniques.

Verification, Model Checking, and Abstract Interpretation - Viktor Kuncak 2012-01-12 This book constitutes the refereed proceedings of the 13th International Conference on Verification, Model Checking, and Abstract Interpretation, VMCAI 2012, held in Philadelphia, PA, USA, in January 2012, co-located with the Symposium on Principles of Programming Languages, POPL 2012. The 26 revised full papers presented were carefully reviewed and selected from 70 submissions. The papers cover a wide range of topics including program verification, model checking, abstract interpretation, static analysis, deductive methods, program certification, debugging techniques, abstract domains, type systems, and optimization.

Automata and Computability - Dexter C. Kozen 2013-11-11 These are my lecture notes from CS381/481: Automata and Computability Theory, a one-semester senior-level course I have taught at Cornell Uni versity for many years. I took this course myself in thc fall of 1974 as a first-year Ph.D. student at Cornell from Juris Hartmanis and have been in love with the subject ever sin,:e. The course is required

for computer science majors at Cornell. It exists in two forms: CS481, an honors version; and CS381, a somewhat gentler paced version. The syllabus is roughly the same, but CS481 go es deeper into thc subject, covers more material, and is taught at a more abstract level. Students are encouraged to start off in one or the other, then switch within the first few weeks if they find the other version more suitaLle to their level of mathematical skill. The purpose of t.hc course is twofold: to introduce computer science students to the rieh heritage of models and abstractions that have arisen over the years; and to dew!c'p the capacity to form abstractions of their own and reason in terms of them.

Discrete Mathematics and Computing - Malik Magdon-Ismail 2019-12-14
This text is a semester course in the basic mathematical and theoretical foundations of computer science. Students who make heavy use of computing should learn these foundations well, setting a base for a follow-on course in algorithms. A solid theoretical and algorithmic foundation in computer science sets the stage for developing good programs, programs that work, always and efficiently.Each chapter is a lecture that has been taught as such. Part I starts with basic logic, proofs and discrete mathematics, including: induction, recursion, summation, asymptotics and number theory. We then continue with graphs, counting and combinatorics, and wrap up the coverage of discrete mathematics with discrete probability. Part II presents the blockbuster application of discrete mathematics: the digital computer and a theory of computing. The goal is to understand what a computer can and cannot do. We start small, with automata, and end big with Turing Machines.Our approach is Socratic. The reader is encouraged to participate actively in the learning process by doing the quizzes and exercises that are liberally sprinkled through the text. The pace and level is

appropriate for readers with one year of training in programming and calculus (college sophomores).

Introduction to Automata Theory, Languages, and Computation - John E. Hopcroft 2014

This classic book on formal languages, automata theory, and computational complexity has been updated to present theoretical concepts in a concise and straightforward manner with the increase of hands-on, practical applications. This new edition comes with Gradiance, an online assessment tool developed for computer science. Please note, Gradiance is no longer available with this book, as we no longer support this product.

Introduction to Computer Theory - Daniel I. A. Cohen 1986-01-17

An easy-to-comprehend text for required undergraduate courses in computer theory, this work thoroughly covers the three fundamental areas of computer theory--formal languages, automata theory, and Turing machines. It is an imaginative and pedagogically strong attempt to remove the unnecessary mathematical complications associated with the study of these subjects. The author substitutes graphic representation for symbolic proofs, allowing students with poor mathematical background to easily follow each step. Includes a large selection of well thought out problems at the end of each chapter.

Computational Complexity - Sanjeev Arora 2009-04-20

New and classical results in computational complexity, including interactive proofs, PCP, derandomization, and quantum computation. Ideal for graduate students.

Twenty Lectures on Algorithmic Game Theory - Tim Roughgarden 2016-08-30

Computer science and economics have engaged in a lively interaction over the past fifteen years, resulting in the new field of algorithmic game theory. Many problems that are central to modern computer science, ranging from resource allocation in large networks to

online advertising, involve interactions between multiple self-interested parties. Economics and game theory offer a host of useful models and definitions to reason about such problems. The flow of ideas also travels in the other direction, and concepts from computer science are increasingly important in economics. This book grew out of the author's Stanford University course on algorithmic game theory, and aims to give students and other newcomers a quick and accessible introduction to many of the most important concepts in the field. The book also includes case studies on online advertising, wireless spectrum auctions, kidney exchange, and network management.
Solutions to Selected Problems to Accompany Switching and Finite Automata Theory - Igal Kohavi 1970

Discrete Mathematics with Applications - Susanna S. Epp 2018-12-17
Known for its accessible, precise approach, Epp's

DISCRETE MATHEMATICS WITH APPLICATIONS, 5th Edition, introduces discrete mathematics with clarity and precision. Coverage emphasizes the major themes of discrete mathematics as well as the reasoning that underlies mathematical thought. Students learn to think abstractly as they study the ideas of logic and proof. While learning about logic circuits and computer addition, algorithm analysis, recursive thinking, computability, automata, cryptography and combinatorics, students discover that ideas of discrete mathematics underlie and are essential to today's science and technology. The author's emphasis on reasoning provides a foundation for computer science and upper-level mathematics courses. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.
Quantum Computation and Quantum Information - Michael A. Nielsen 2000-10-23

First-ever comprehensive introduction to the major new subject of quantum computing and quantum information.